CLAIMS

1. A method for determining a transition model between input pixel samples from which output sample values are calculated, the input pixel samples having corresponding input sample values, the method comprising:

determining from the input sample values a brightness condition;

using a first transition model that preserves a constant luminance where the brightness condition is indicative of light isolated pixels; and

using a second transition model that preserves a constant darkness where the brightness condition is indicative of dark isolated pixels.

2. The method of claim 1 wherein the first transition model comprises a cubic polynomial model solved using a light gradient value gr_{lt} and a dark gradient value gr_{dk} having the values:

$$gr_{lt} = \frac{1}{gm}, \text{ and}$$

$$gr_{dk} = 8\left(\frac{1}{2}\right)^{gr_{lt}} - 4 + gr_{lt},$$

where gm is a display gamma value.

3. The method of claim 2 wherein the display gamma value is equal to 2.5.

4. The method of claim 1 wherein the second transition model comprises a cubic polynomial model solved using a light gradient value gr_{lt} and a dark gradient value gr_{dk} having the values:

$$gr_{lt} = \frac{1}{0.4 \times gm}, \text{ and}$$

$$gr_{dk} = 8\left(\frac{1}{2}\right)^{gr_{lt}} - 4 + gr_{lt},$$

where gm is a display gamma value.

5. The method of claim 4 wherein the display gamma value is equal to 2.5.

6. The method of claim 1, further comprising using a third transition model that is based on a sine-model having an angular frequency of π where the brightness condition is indicative of alternating light and dark pixels.

7. The method of claim 1, further comprising using a cubic transition model solved using a light gradient value $gr_{lt} = 0$ and a dark gradient value $gr_{dk} = 0.5$ where the brightness condition is indicative of alternating light and dark pixels.

8. The method of claim 7 wherein determining a brightness condition from the input sample values comprises:

selecting sixteen pixel samples arranged in a four-by-four pixel array from the sample set;

identifying along a first axis pixel samples having pixels on either side having equal sample values; and

identifying along a second axis pixel samples having pixels on either side having equal sample values, the second axis perpendicular to the first axis.

9. The method of claim 1 wherein the input pixel samples are arranged in a coordinate system and the method further comprises:

detecting a diagonal pixel pattern from the input sample values;

where a diagonal pixel pattern is detected, modifying the coordinate system in which the pixel samples are arranged; and

calculating a fractional position using the modified coordinate system at which the output sample values are to be calculated using the appropriate transition model.

10. The method of claim 9 wherein modifying the coordinate system comprises rotating the coordinate system by 45 degrees.

11. A method for calculating output sample values from input sample values corresponding to respective input pixel samples, the method comprising:

comparing sample values of a selected sample set of input sample values;

determining from the sample values of the sample set whether a first or second brightness condition is present;

where the first brightness condition is detected, defining a first emphasis model for the sample set and where the second brightness condition is detected, defining a second emphasis model for the sample set; and

calculating output sample values from the defined emphasis model.

12. The method of claim 11 wherein the first brightness condition comprises an isolated light pixel condition and the second brightness condition comprises an isolated dark pixel condition.

13. The method of claim 12 wherein the first emphasis model comprises a cubic polynomial model solved using a light gradient value gr_{lt} and a dark gradient value gr_{dk} having the values:

$$gr_{lt} = \frac{1}{gm}, \text{ and}$$

$$gr_{dk} = 8\left(\frac{1}{2}\right)^{gr_{lt}} - 4 + gr_{lt},$$

where gm is a display gamma value.

14. The method of claim 13 wherein the display gamma value is equal to 2.5.

15. The method of claim 12 wherein the second emphasis model comprises a cubic polynomial model solved using a light gradient value gr_{lt} and a dark gradient value gr_{dk} having the values:

$$gr_{lt} = \frac{1}{0.4 \times gm}, \text{ and}$$

$$gr_{dk} = 8\left(\frac{1}{2}\right)^{gr_{lt}} - 4 + gr_{lt},$$

where *gm* is a display gamma value.

16. The method of claim 15 wherein the display gamma value is equal to 2.5.

17. The method of claim 11, further comprising:

determining whether a third brightness condition is present from the sample set of input sample values, the third brightness condition comprising alternating light and dark pixels; and

if the third brightness condition is present, defining a third emphasis model for the sample set.

18. The method of claim 17 wherein the third emphasis model comprises a sine-model having an angular frequency of π.

19. The method of claim 17 wherein the third emphasis model comprises a cubic transition model using a light gradient value $gr_{lt} = 0$ and a dark gradient value $gr_{dk} = 0.5$.

20. The method of claim 17 wherein determining whether a third brightness condition is present from the sample set of input sample values comprises:

selecting sixteen pixel samples arranged in a four-by-four pixel array from the sample set;

identifying along a first axis pixel samples having pixels on either side having equal sample values; and

identifying along a second axis pixel samples having pixels on either side having equal sample values, the second axis perpendicular to the first axis.

21. The method of claim 11, further comprising:

determining whether a fourth brightness condition is present from the input sample values, the fourth brightness condition comprising a transition in pixel brightness without emphasis; and

if the fourth brightness condition is present, defining a fourth emphasis model for the sample set.

22. The method of claim 1 wherein the input pixel samples are arranged in a coordinate system and the method further comprises:

detecting a diagonal pixel pattern from the input sample values;

where a diagonal pixel pattern is detected, modifying the coordinate system in which the pixel samples are arranged; and

calculating a fractional position using the modified coordinate system at which the output sample values are to be calculated using the appropriate transition model.

23. The method of claim 22 wherein modifying the coordinate system comprises rotating the coordinate system by 45 degrees.

24. A resampling circuit adapted to receive signals representing respective input sample values for corresponding pixel samples and calculating output sample values therefrom, the resampling circuit comparing sample values of a selected sample set of input sample values, determining from the sample values of the sample set whether a first or second brightness condition is present, where the first brightness condition is detected, defining a first emphasis model for the sample set and where the second brightness condition is detected, defining a second emphasis model for the sample set, and calculating output sample values from the defined emphasis model.

25. The resampling circuit of claim 24 wherein the first brightness condition comprises an isolated light pixel condition and the second brightness condition comprises an isolated dark pixel condition.

26. The resampling circuit of claim 25 wherein the first emphasis model comprises a cubic polynomial model solved using a light gradient value gr_{lt} and a dark gradient value gr_{dk} having the values:

$$gr_{lt} = \frac{1}{gm}, \text{ and}$$

$$gr_{dk} = 8\left(\frac{1}{2}\right)^{gr_{lt}} - 4 + gr_{lt},$$

where gm is a display gamma value.

27. The resampling circuit of claim 26 wherein the display gamma value is equal to 2.5.

28. The resampling circuit of claim 25 wherein the second emphasis model comprises a cubic polynomial model solved using a light gradient value gr_{lt} and a dark gradient value gr_{dk} having the values:

$$gr_{lt} = \frac{1}{0.4 \times gm}, \text{ and}$$

$$gr_{dk} = 8\left(\frac{1}{2}\right)^{gr_{lt}} - 4 + gr_{lt},$$

where gm is a display gamma value.

29. The resampling circuit of claim 28 wherein the display gamma value is equal to 2.5.

30. The resampling circuit of claim 24 further adapted to determine whether a third brightness condition is present from the sample set of input sample values, the third brightness condition comprising alternating light and dark pixels, and if the third brightness condition is present, define a third emphasis model for the sample set.

31. The resampling circuit of claim 30 wherein the third emphasis model comprises a sine-model having an angular frequency of π.

32. The resampling circuit of claim 30 wherein the third emphasis model comprises a cubic transition model using a light gradient value $gr_{lt} = 0$ and a dark gradient value $gr_{dk} = 0.5$.

33. The resampling circuit of claim 30 wherein determining whether a third brightness condition is present from the sample set of input sample values comprises:

selecting sixteen pixel samples arranged in a four-by-four pixel array from the sample set;

identifying along a first axis pixel samples having pixels on either side having equal sample values; and

identifying along a second axis pixel samples having pixels on either side having equal sample values, the second axis perpendicular to the first axis.

34. The resampling circuit of claim 24 further adapted to determine whether a fourth brightness condition is present from the input sample values, the fourth brightness condition comprising a transition in pixel brightness without emphasis, and if the fourth brightness condition is present, defining a fourth emphasis model for the sample set.

35. The resampling circuit of claim 24 further adapted to detect a diagonal pixel pattern from the input sample values, where a diagonal pixel pattern is detected, modify a coordinate system in which the pixel samples are arranged, and calculate a fractional position using the modified coordinate system at which the output sample values are to be calculated using the appropriate transition model.

36. The method of claim 22 wherein modifying the coordinate system comprises rotating the coordinate system by 45 degrees.

37. A graphics processing system, comprising:

a bus interface for coupling to a system bus;

a graphics processor coupled to the bus interface to process graphics data;

address and data busses coupled to the graphics processor to transfer address and graphics data to and from the graphics processor;

display logic coupled to the data bus to drive a display; and

a resampling circuit coupled to the graphics processor and the display logic and adapted to receive signals representing respective input sample values for corresponding pixel samples and calculating output sample values therefrom, the resampling circuit comparing sample values of a selected sample set of input sample values, determining from the sample values of the sample set whether a first or second brightness condition is present, where the first brightness condition is detected, defining a first emphasis model for the sample set and where the second brightness condition is detected, defining a second emphasis model for the sample set, and calculating output sample values from the defined emphasis model.

38. The graphics processing system of claim 24 wherein the first brightness condition comprises an isolated light pixel condition and the second brightness condition comprises an isolated dark pixel condition.

39. The graphics processing system of claim 38 wherein the first emphasis model comprises a cubic polynomial model solved using a light gradient value gr_{lt} and a dark gradient value gr_{dk} having the values:

$$gr_{lt} = \frac{1}{gm}, \text{ and}$$

$$gr_{dk} = 8\left(\frac{1}{2}\right)^{gr_{lt}} - 4 + gr_{lt},$$

where gm is a display gamma value.

40. The graphics processing system of claim 39 wherein the display gamma value is equal to 2.5.

41. The graphics processing system of claim 38 wherein the second emphasis model comprises a cubic polynomial model solved using a light gradient value gr_{lt} and a dark gradient value gr_{dk} having the values:

$$gr_{lt} = \frac{1}{0.4 \times gm}, \text{ and}$$

$$gr_{dk} = 8\left(\frac{1}{2}\right)^{gr_{lt}} - 4 + gr_{lt},$$

where gm is a display gamma value.

42. The graphics processing system of claim 41 wherein the display gamma value is equal to 2.5.

43. The graphics processing system of claim 37 wherein the resampling circuit is further adapted to determine whether a third brightness condition is present from the sample set of input sample values, the third brightness condition comprising alternating light and dark pixels, and if the third brightness condition is present, define a third emphasis model for the sample set.

44. The graphics processing system of claim 43 wherein the third emphasis model comprises a sine-model having an angular frequency of π.

45. The graphics processing system of claim 43 wherein the third emphasis model comprises a cubic transition model using a light gradient value $gr_{lt} = 0$ and a dark gradient value $gr_{dk} = 0.5$.

46. The graphics processing system of claim 43 wherein determining whether a third brightness condition is present from the sample set of input sample values comprises:

selecting sixteen pixel samples arranged in a four-by-four pixel array from the sample set;

identifying along a first axis pixel samples having pixels on either side having equal sample values; and

identifying along a second axis pixel samples having pixels on either side having equal sample values, the second axis perpendicular to the first axis.

47. The graphics processing system of claim 37 wherein the resampling circuit is further adapted to determine whether a fourth brightness condition is present from the input sample values, the fourth brightness condition comprising a transition in pixel brightness without emphasis, and if the fourth brightness condition is present, defining a fourth emphasis model for the sample set.

48. The graphics processing system of claim 37 wherein the resampling circuit is further adapted to detect a diagonal pixel pattern from the input sample values, where a diagonal pixel pattern is detected, modify a coordinate system in which the pixel samples are arranged, and calculate a fractional position using the modified coordinate system at which the output sample values are to be calculated using the appropriate transition model.

49. The graphics processing system of claim 48 wherein modifying the coordinate system comprises rotating the coordinate system by 45 degrees.